Clinical management of carpal tunnel syndrome: a 12-year review of outcomes
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Authors' objectives
To identify scientifically validated treatment and rehabilitation approaches for carpal tunnel syndrome (CTS).

Searching
The authors searched the electronic databases of MEDLINE, CINAHL, PsycLIT, and NIOSHTIC for publications between January 1986 and December 1997 using the keywords 'outcome', 'surgery', 'therapy', and 'treatment'. The search was limited to English language publications.

Study selection

There were six study designs:

1. Prospective multiple group, in which patients were randomly assigned to treatment conditions and were followed longitudinally.
2. Non-randomised prospective multiple group, in which patients were assigned to different treatment conditions and followed longitudinally, but the assignment was not random.
3. Single group prospective, in which all patients were assigned to a single treatment group and followed longitudinally.
4. Multiple group retrospective, in which patients were assigned to different treatment conditions, and archival data were analysed to assess outcomes.
5. Single group retrospective, in which patients were assigned to one treatment condition and archival data were used.
6. Case study, which presented data on single patient outcomes.

All prospective multiple group studies available were included in the review. Other study designs were included depending on availability of studies with higher levels of study design within the treatment category.

Specific interventions included in the review
Surgery (open and endoscopic release), pharmacological/vitamins/steroids (taken orally, injected into the carpal canal or transported via iontophoresis), physical therapy (range or motion exercises)/splinting, chiropractic/manipulation, biobehavioural therapies (individual and group cognitive behaviour therapy, muscle activity biofeedback, neuromuscular re-education and movement retraining), and occupational/work rehabilitation.

Participants included in the review
People with diagnosed carpal tunnel syndrome, or diagnoses such as 'hand pain', both work-related and non-work-related.

Outcomes assessed in the review
Medical status (two-point discrimination, nerve conduction velocity, Semmes-Weinstein, Phalen's test, Tinel's test, thenar atrophy, interstitial pressure), symptoms (self report) (pain, tenderness, numbness, parasthesia, weakness, night symptoms, fine dexterity loss), function (grip, key pinch, pulp pinch, range of motion, activities of daily living), work status (median days out of work, workers' compensation status, working with pain), psychological well-being (anxiety, depression, coping strategies, sickness), patient satisfaction (treatment satisfaction rating).

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

**Assessment of study quality**

The authors do not report the method used to assess quality, or how the quality assessment was performed.

**Data extraction**

The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

**Methods of synthesis**

*How were the studies combined?*

The studies were combined in a narrative review which gave a description of each individual intervention and then reported the results of each individual study to give a synthesis of the results for that intervention. For those studies that used statistical analysis, only significant findings are reported.

*How were differences between studies investigated?*

The authors do not state how differences between the studies were investigated.

**Results of the review**

Thirty-four studies met the inclusion criteria: 6 randomised prospective multiple group studies on surgical interventions for CTS with 485 participants (252 in the treatment group, and 233 in the comparison group); 8 non-randomised prospective multiple group studies on surgical interventions for CTS with 1,007 participants (400 in the treatment group, and 396 in the comparison group, with 1 study having three groups of 72, 90, and 49 participants); 6 studies in the pharmacological/vitamins/steroid injections intervention with 290 participants; 6 studies in the physical therapy/splinting for CTS intervention with 332 participants; 1 study in the chiropractic treatment for CTS intervention with 40 participants; 5 studies in the biobehavioural interventions for CTS group with more than 98 participants; and 2 studies in the work/occupational rehabilitation for CTS group with 400 participants.

Endoscopic release was associated with higher levels of physical functioning and fewer days to return to work when compared with open release. Both types of surgery were associated with less pain at follow-up compared to pre-surgical levels.

Steroid injections combined with splinting and surgery and oral use of B6 were associated with pain reduction.

In comparison to splinting, range of motion exercises appeared to be associated with less pain and fewer days to return to work.

Cognitive behaviour therapy yielded reductions in pain, anxiety, and depression in one study.

Multidisciplinary occupational rehabilitation was associated with a higher percentage of chronic cases returning to work than usual care.

**Cost information**

In 1989, the average claim amount (medical and indemnity) for new cases of CTS was $8,070. Recently, (reported in 1998), compensation claims for the federal workforce that involved CTS had an average indemnity cost of $4,941 per claim.

**Authors' conclusions**

Conclusions are preliminary due to the small number of well-controlled studies, variability in duration of symptoms.
and disability, and the broad range of reported outcome measures. While there are several opinions regarding effective treatment, there is very little scientific support for the range of options currently used in practice. Despite the emerging evidence of the multivariate nature of CTS, the majority of outcome studies have focused on single interventions directed at individual etiological factors or symptoms and functional limitations secondary to CTS.

**CRD commentary**
The literature search did cover several databases for relevant material, but it is not clear whether additional studies may have been missed because unpublished and non-English publications were not included.

The authors have not reported on how the articles were selected, or how the quality of the chosen studies was assessed. There is also no report as to who, or how many of the authors, selected the articles and extracted the data. The categorisation of studies for the review was based on the abstracts found in the literature search, which may not have provided sufficient data to categorise the studies appropriately. The data from each study is described in a subjective narrative review which gives detail about each study and summarises the outcome for each intervention. There is no discussion about the heterogeneity between the studies which include a wide range of participants and treatments. The results from these studies should be viewed with caution because of the review's limitations.

**Implications of the review for practice and research**
Practice: The authors state that in practice, given the evidence to date regarding surgery, particularly in workers’ compensation cases, conservative care of the patient with CTS should be emphasised as a logical first step. This point is important in those cases where neurological findings are inconsistent or absent.

Research: The authors state that this review shows the limitations of existing outcomes research in this area which may guide the design of further research.

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